

What is claimed is:

3 1. An electric hand tool comprising a machine housing (11), with an electric
4 motor (12) accommodated in the machine housing (11) for driving a tool (13),
5 and a fan wheel (21) accommodated in the machine housing (11) for generating
6 a cooling air current that flows through the machine housing (11), which said fan
7 wheel creates a suction space (22) and a pressure space (23) on opposite sides
8 when it rotates,

9 wherein means for generating an additional air current are provided and
10 configured such that the additional air current flows onto at least one machine
11 component that is located outside of or in a low-flow region of the cooling air
12 current.

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14 2. The electric hand tool as recited in Claim 1,
15 wherein the electric motor (12) includes a motor winding (31) with winding heads
16 (311) that project outward on at least one end face of the electric motor (12),
17 the fan wheel (21) is located with axial clearance in front of the end face of the
18 electric motor (12) and is configured such that the suction space (22) is located in
19 front of the end face of the electric motor (12) where the winding heads (31) are
20 located, and the means for generating the additional air current have air inlets
21 that lead into the suction space (22).

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23 3. The electric hand tool as recited in Claim 2,
24 wherein the air inlets are air inlet openings (24) that are configured in the wall of
25 the machine housing (11) on or near the end face of the electric motor (12).

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27 4. The electric hand tool as recited in Claim 2,
28 wherein the air inlets are passages (25) located in a dividing wall (40; 26) that
29 separates the pressure space (23) from the suction space (22) and, preferably,
30 the passages (25) are separated from the axis of the fan wheel by the greatest
31 radial distance possible.

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2 5. The electric hand tool as recited in Claim 4,
3 wherein the dividing wall (40) is fixed in position, and is mounted on the machine
4 housing (11), or it is part of the machine housing (11).

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6 6. The electric hand tool as recited in Claim 4,
7 wherein the dividing wall rotates with the fan wheel (21) and is an integral part of
8 the fan wheel (21).

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10 7. The electric hand tool as recited in Claim 6,
11 wherein the fan wheel (21) has a base plate (27) with a hub (271) for sliding onto
12 a driven shaft (15) of the electric motor (12), a cover plate (26) that has axial
13 clearance from the base plate (27) and forms the dividing wall, and radially
14 oriented fan vanes (28) that are located between the base and cover plate (27,
15 26), and air outlet openings (19) are located in the wall of the machine housing
16 (11) on the pressure side of the fan wheel (21) in the region of the vane ends.

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18 8. The electric hand tool as recited in Claim 1,
19 wherein the electric motor (12) has a motor winding (31) with winding heads
20 (311) that project outward on at least one end face of the electric motor (12), and
21 the means for generating the additional air current has openings in the wall of the
22 machine housing (11) that are located in the region of the end face of the electric
23 motor (12) on which the winding heads (311) are carried.

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25 9. The electric hand tool as recited in one of the Claims 1-8,
26 wherein the means for generating an additional air current have air guide
27 elements (41) that divert a sub-current, as the additional air current, from the
28 cooling air current.

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30 10. The electric hand tool as recited in Claim 9,

1 wherein the electric motor (10) has a stator (30), a rotor (32) and an air gap (33)
2 located between the two, and the air guide elements (41) are located in the
3 suction space (22) and are configured such that a sub-current is diverted to the
4 winding heads (311) from the cooling air current passing through the air gap (33)
5 and into the suction space (22).

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7 11. The electric hand tool as recited in one of the Claims 1-10,
8 wherein the means for generating the additional air current have at least one air
9 duct (34) guided in the machine housing (11), and one end of the duct is located
10 in the cooling air stream, and the other end of the duct is located at or near the
11 machine component (17).

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13 12. The electric hand tool as recited in Claim 11,
14 wherein the duct inlet is located at or near the machine component (17), and the
15 duct outlet leads into the suction space (22) of the fan wheel (21).

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17 13. The electric hand tool as recited in Claim 11 or 12,
18 wherein the air duct (34) is formed in the wall of the machine housing (11).

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20 14. The electric hand tool as recited in Claim 13,
21 wherein the machine housing (11) has two shells, and one part (341, 342) of the
22 air duct (34) is formed in each housing shell (111, 112) such that, when the two
23 housing shells (111, 112) are joined, the air duct (34) is formed.

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25 15. The electric hand tool as recited in one of the Claims 1-14,
26 wherein the electric motor (12) includes a commutator (37) with commutator
27 brushes (38), and the means for generating an additional air current with the
28 commutator (37) have air turbulence-generating elements (42) around the
29 periphery, which are arranged such that the additional air current they generate
30 flows across the commutator surface.

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1 16. The electric hand tool as recited in Claim 15,
2 wherein the air turbulence-generating elements (42) are formed on the
3 commutator (37) itself.

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5 17. The electric hand tool as recited in Claim 15,
6 wherein the air turbulence-generating elements (42) are the fan vanes (43) of an
7 axial fan wheel (44) that is joined with the commutator (37) in torsion-proof
8 fashion.

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10 18. The electric hand tool as recited in one of the Claims 15-17,
11 wherein the commutator brushes (38) are displaceably held in a brush cartridge
12 (39), and the brush cartridges (39) are equipped with cooling ribs (47).

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14 19. The electric hand tool as recited in one of the Claims 11-18,
15 wherein the machine component is an on/off switch (17) for the electric motor
16 (12) or a battery pack for supplying power.